OPERATING SUMMARY

WATERDOWN

1972

LABORATORY LIBRARY
MINISTRY OF THE ENVIRONMENT

LIBRARY C
JUN 15 1973
MINISTRY OF THE
ENVIRONMENT

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D. S. Caverly,
Assistant Deputy Minister.

D. McTavish

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable James A.C. Auld

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
D.S. Caverly

EXECUTIVE DIRECTOR
K.H. Sharpe

PROJECT OPERATIONS BRANCH

DIRECTOR
D.A. McTavish

ASSISTANT DIRECTOR
C.W. Perry

REGIONAL SUPERVISOR
P.J. Osmond

OPERATIONS ENGINEER
A. Clark

135 St. Clair Avenue West
Toronto 195

WATERDOWN

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF WATERDOWN

by the

MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

CONTENTS

Title Page 1

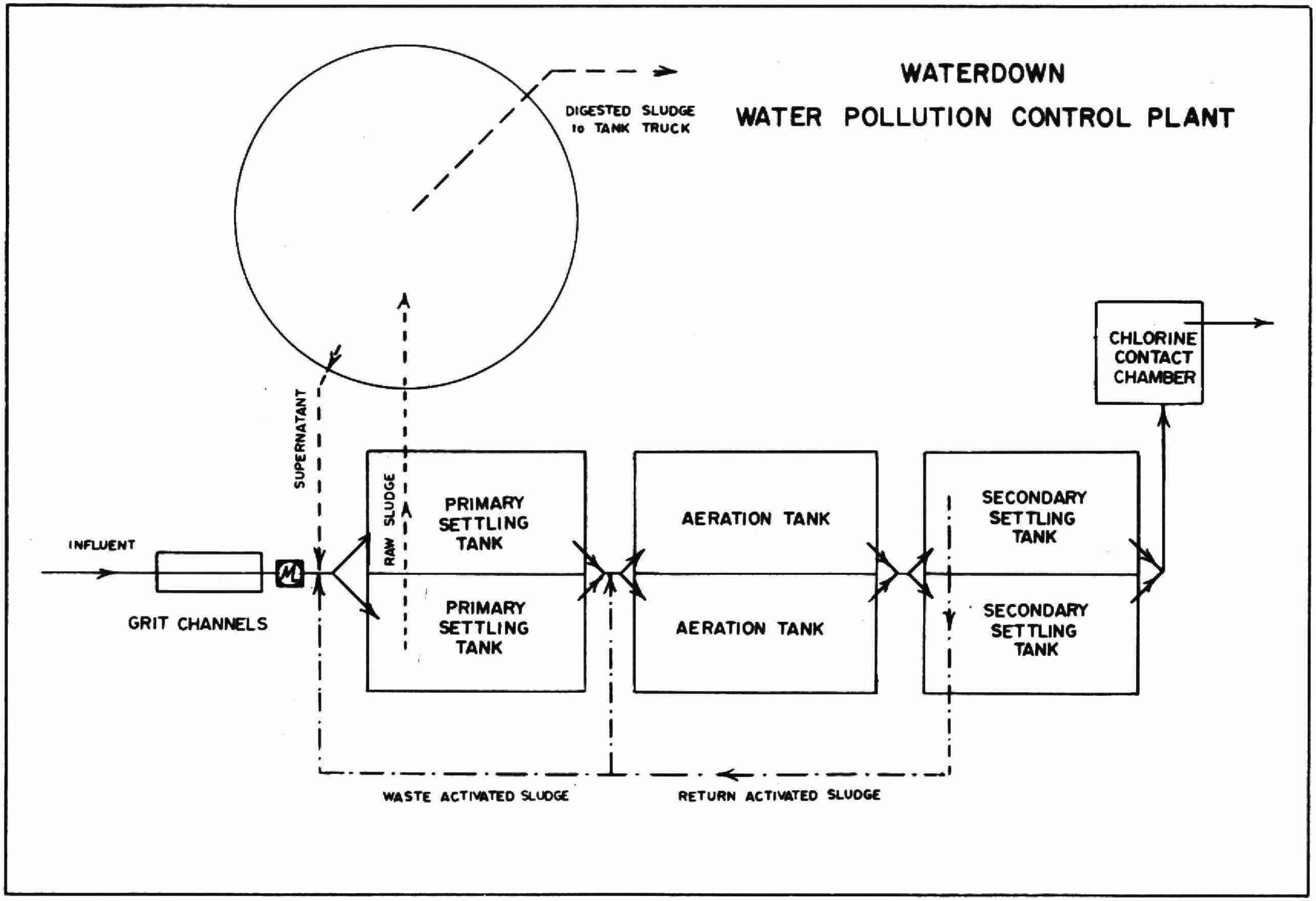
Flow Diagram 4

Design Data 5

'72 Review 6

Project Costs 8

Process Data 11



WATERDOWN
WATER POLLUTION CONTROL PLANT

DESIGN DATA

PROJECT NO.	2-0163-63
TREATMENT	Activated Sludge
DESIGN FLOW	0.30 mgd

PRIMARY TREATMENT

Screening

Type: Manually cleaned
Size: One 2" spacing

Grit Removal

Type: Channel, manually cleaned

Primary Sedimentation

Type: Walker Process CRP
Size: Two 30' x 8' x 8' (24,000 gal)
Retention: 1.9 hours
Loadings: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, single-pass
Size: Two 50' x 14' x 11' (15,400 ft^3 or 96,000 gal)
Retention: 7.7 hours

Air Supply

Type: Aerzener Blowers
Size: Two 600 cfm

Diffusers

Type: Chicago Pump Discfusers
Spacing: 48 (total) @ 2' centres

Secondary Sedimentation

Type: Walker Process CR
Size: Two 30' x 8' x 11' (33,000 gal)
Retention: 2.6 hours
Loading: Surface 625 gal/ft^2/day
Weir 6,520 gal/ft/day

CHLORINATION

- One F & P 2-40 lb/day

Chlorine Contact Chamber

Size: 6' x 17' x 8'-9" (5,600 gal)
Retention: 27 minutes

OUTFALL

- to Grindstone Creek

SLUDGE HANDLING

Digestion System - single stage
Type: Fixed steel cover, mixed by recirculation
Size: One 30' dia x 17' swd
(15,100 ft^3 or 94,000 gal)

'72 Review

GENERAL

The Waterdown project consists of a 0.30 mgd secondary water pollution control plant employing the conventional form of the activated sludge treatment process. The plant is located in a ravine in the southwest area of the Village. Plant effluent is discharged to Grindstone Creek and thence to Lake Ontario. Sludge is digested anaerobically and hauled by tank truck for land disposal.

Included in the project operation are two pumping stations and the sewer collection system. One of these pumping stations and sewers to service the north east section of the Village was added to the system during 1972. The cost of operating the pumping stations and sewers is included as part of the project operating costs shown in the body of this report.

Research work by the Canada Centre for Inland Waters continued through 1972 and will continue for at least part of 1973. The work involves studies of various effects of NTA (nitrilotric-acetic acid, a detergent substitute) in sewage.

EXPENDITURES

Total operating costs were approximately $20,000 in 1972 as compared to $15,921.19 in 1971. The 1972 figure includes estimated corrections in salary charges for the period October 1 to December 31, 1973. These corrections have not been finalized to date.

PLANT FLOWS and CHLORINATION

The total flow for 1972 is estimated to be approximately 40 million gallons. The flowmeter was out of service for several months of the year, due to difficulty in obtaining replacement parts.

An average chlorine dosage of 10.4 mg/l was required to maintain a residual of at least 1.0 mg/l for a 15 minute contact period. The high residual was maintained to ensure a complete bacterial kill before discharging the plant effluent to Grindstone Creek.

PLANT EFFICIENCY

The average raw sewage strength was 214 mg/l BOD and 241 mg/l suspended solids, both slightly lower than the 1971 values of 261 mg/l BOD and 274 mg/l suspended solids. The removal efficiency for BOD was 95 percent, and for suspended solids was 93 percent. The removal efficiency for BOD was unchanged from 1971, but the removal efficiency for suspended solids was slightly lower than during the previous year.

During 1972 the phosphorus level in the raw sewage averaged 12.5 mg/l as compared to 18.0 mg/l during the previous year. The phosphorus level in the plant effluent dropped from 9.3 mg/l in 1971 to 6.0 mg/l in 1972.

SLUDGE DIGESTION AND DISPOSAL

A total of 376,000 gallons of raw sludge was pumped to the digester. A total of 1240 cubic yards of sludge was removed from the plant by tank truck for land disposal.

CONCLUSIONS

Plant efficiency continued at a high level during the year. The effluent quality for BOD was well within Ministry of the Environment objectives. The effluent quality for suspended solids was not as good and did not quite meet Ministry objectives on the average during the year.

PROJECT COSTS

NET CAPITAL COST	$475,418.08
DEDUCT - Portion financed by CMHC	(140,977.13)
Municipal Advances	(119,885.79)
Long Term Debt to MOE	$214,555.16
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	$ 35,496.37

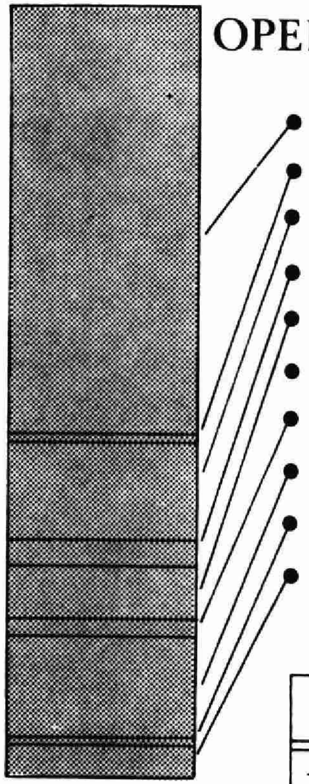
Net Operating	$ 18,795.69
Debt Retirement	2,642.00
Reserve	2,076.92
Interest Charged	12,032.03
TOTAL	$ 35,546.64

RESERVE ACCOUNT

Balance @ January 1, 1972	$ 17,374.36
Deposited by Municipality	2,076.92
Interest Earned	1,164.68
	$ 20,615.96
Less Expenditures	-
Balance @ December 31, 1972	$ 20,615.96

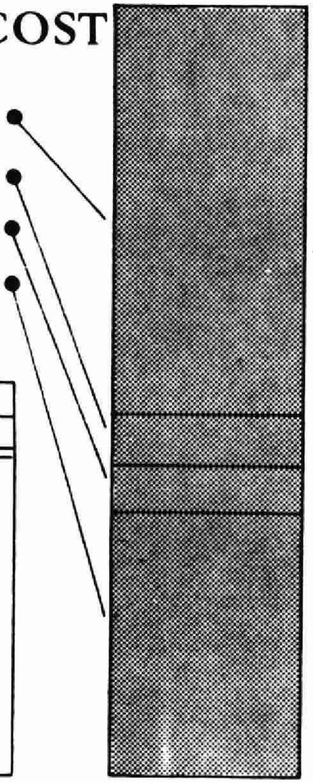
1972 COSTS

OPERATING COSTS



PAYROLL	56 %
FUEL	1 %
POWER	13 %
CHEMICALS	4 %
GENERAL SUPPLIES	7 %
EQUIPMENT	NIL %
REPAIRS & MAINTENANCE	2 %
SUNDRY	13 %
WATER	< 1 %
TRAVEL	3 %

TOTAL ANNUAL COST



NET OPERATING	53 %
DEBT RETIREMENT	7 %
RESERVE	6 %
INTEREST	34 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			$ per million gal	¢ per lb BOD
1968	21.22	12,065.26	568.58	23 cents
1969	22.00	11,294.85	513.40	15 cents
1970	16.6	14,985.03	562.50	26 cents
1971	34.0 *	15,921.18	468.30	20 cents
1972	44.0 *	16,897.92	384.00	24 cents

* Estimate

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	165.48				149.83					15.65		
FEB	860.00			34.21	182.34		41.00			589.85		12.60
MAR	664.19			24.32	187.98	170.55	37.88			240.46	3.00	
APR	427.77	9.00		36.05	200.32	130.50	15.80			15.70	5.40	15.00
MAY	635.54			18.92	179.83		14.44			407.50	3.30	11.55
JUNE	828.04			28.58	168.01		532.33		63.53	31.79	3.80	
JULY	524.43			6.50	196.77		76.80		95.00	134.36	3.00	12.00
AUG	333.28			10.41	163.55	123.90	20.83			(2.06)	3.00	13.65
SEPT	237.57			6.84			19.21			199.97		11.55
OCT	297.62				183.02		45.82		49.35	16.43	3.00	
NOV	10465.68	9059.88	428.77	13.17	394.28		38.89			524.69	6.00	
DEC	1458.31			6.38	206.92	212.40	314.55		67.49	111.12	17.75	521.70
TOTAL	16897.91	9068.88 **	428.77	185.38	2212.85	637.35	1157.55		275.37	2285.46	48.25	598.05

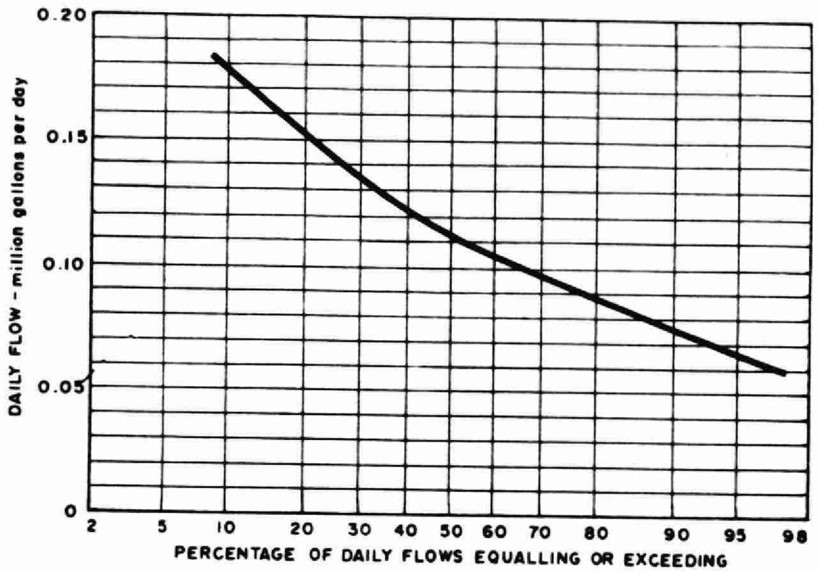
Brackets indicate credit.

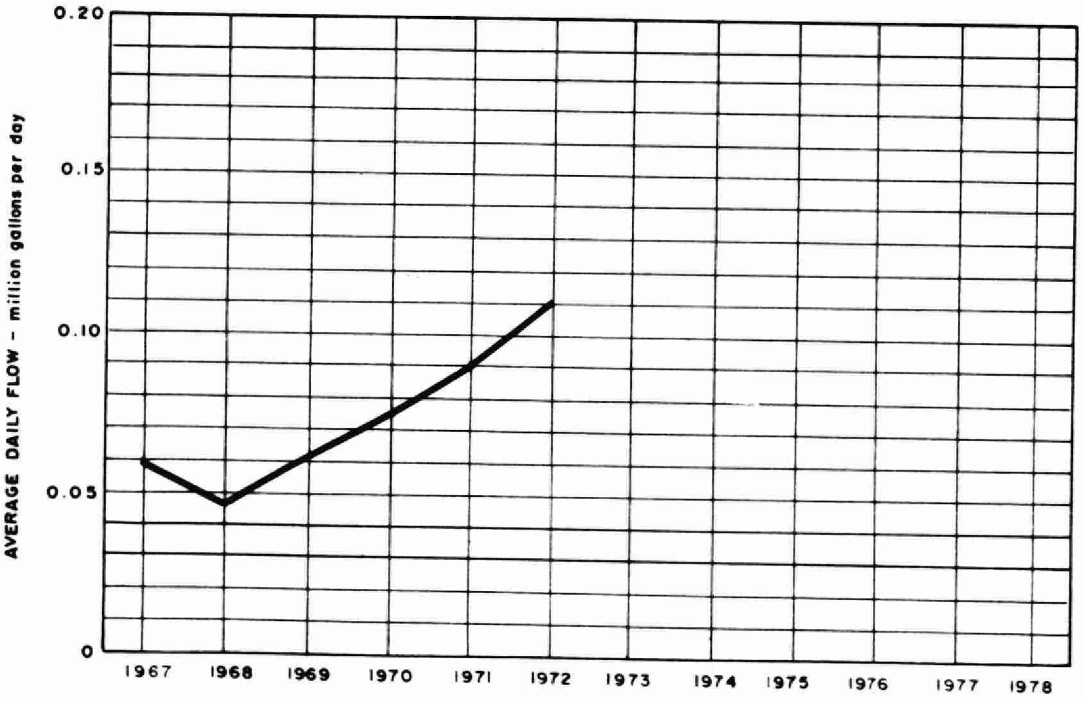
* Sundry includes sludge haulage costs of $1,237.50

** 9 months salary only

PROCESS DATA

FLOWS



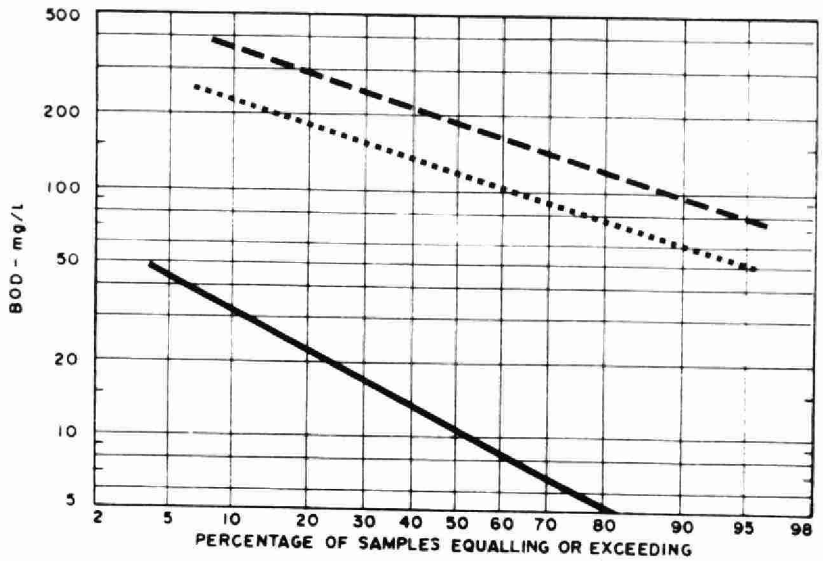


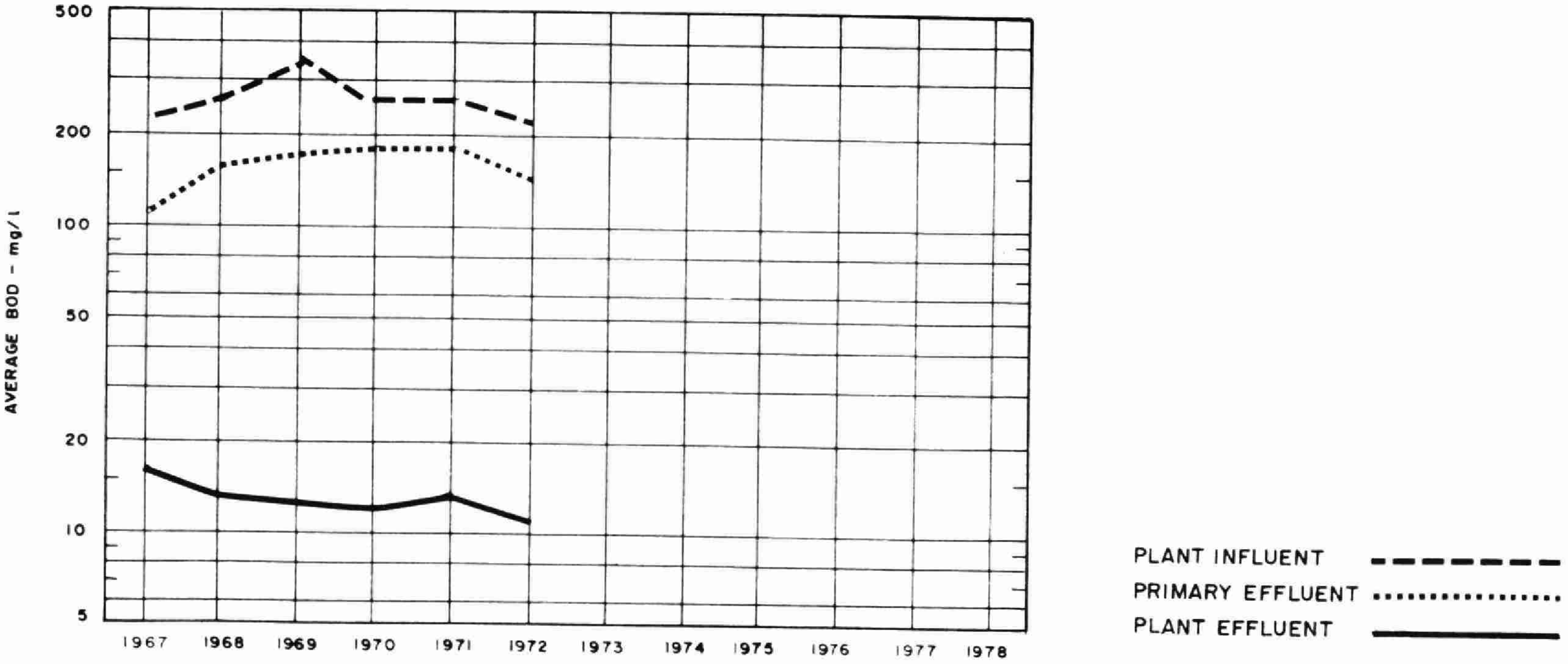
DESIGN CAPACITY 0.30 mgd

PLANT PERFORMANCE

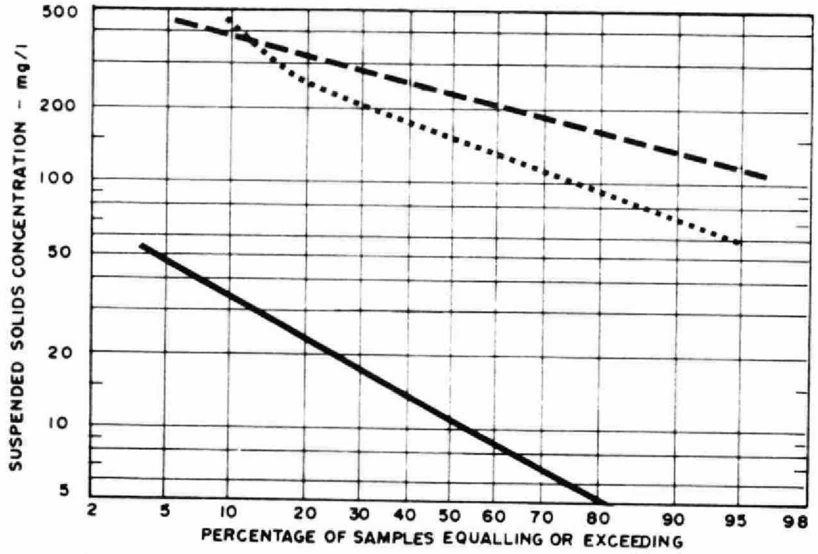
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10^3 pounds			%	10^3 pounds		
JAN	2.8 (est)	.09	.24	138	16	88	3.4	176	22	87	4.3	8.1	5.9
FEB	2.1	.07	.09	110	38	65	1.5	185	23	88	3.4	12.0	3.0
MAR	4.1	.13	.23	320	18	94	12.4	355	20	94	13.7	9.8	.8
APR	5.1	.17	.28	200	6	97	9.9	157	14	91	7.3	9.6	3.9
MAY	4.2	.14	.22	100	8	92	3.9	270	10	96	10.9	6.2	.2
JUNE	3.8	.13	.21	140	10	93	4.9	175	13	93	6.1	8.8	5.8
JULY	o/s	-	-	170	6	96	-	242	15	94	-	13.0	9.7
AUG	o/s	-	-	600	4	99	-	198	13	93	-	9.3	3.9
SEPT	-	-	-	220	4	98	-	242	11	96	-	42.0	9.0
OCT	-	-	-	260	2	99	-	344	14	96	-	12.0	12.0
NOV	-	-	-	190	16	92	-	215	16	93	-	7.3	8.4
DEC	-	-	-	200	-	-	-	235	15	94	-	16.0	9.6
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG.	-	.12	MAXIMUM .28	214	11	95	6.0	241	16	93	7.6	12.5	6.0
No. of Samples	-	-	-	13	12	-	-	54	52	-	-	13	13

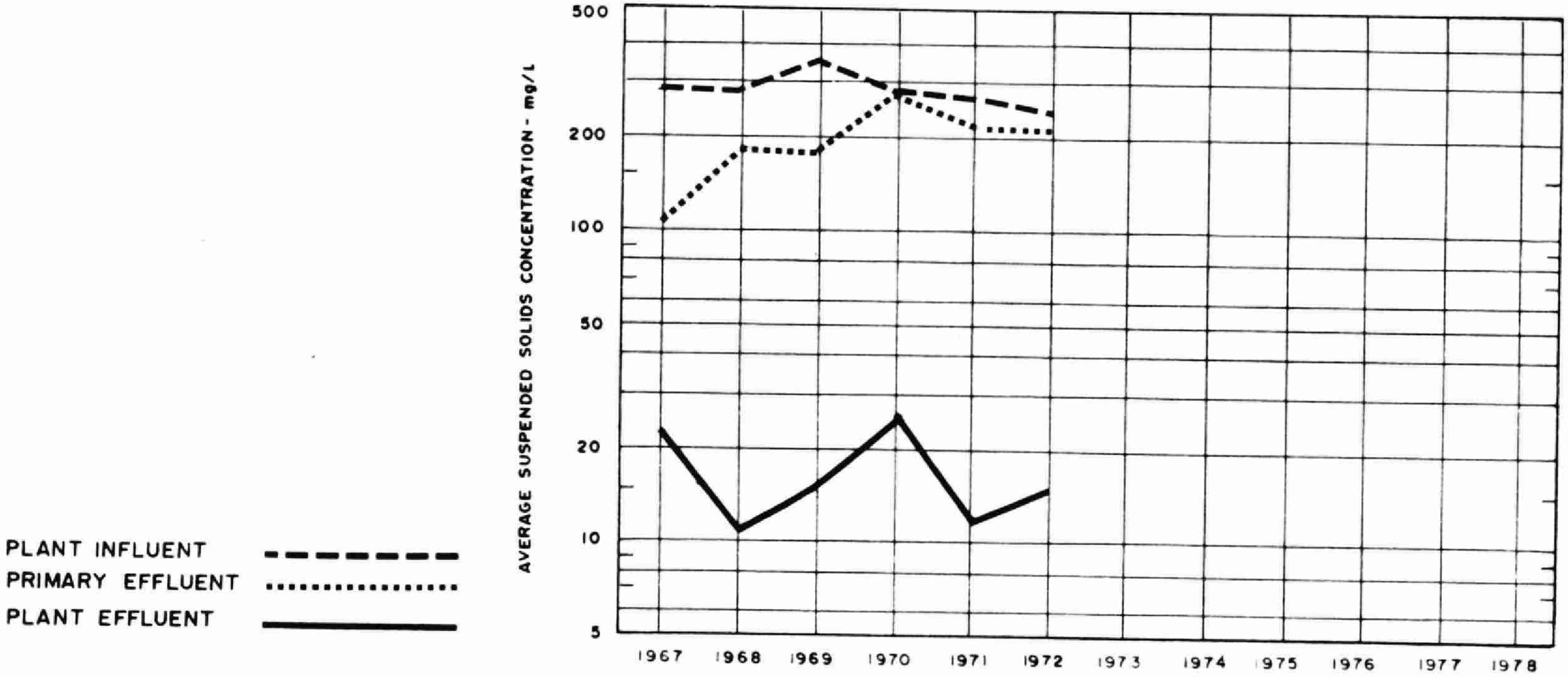
BIOCHEMICAL OXYGEN DEMAND



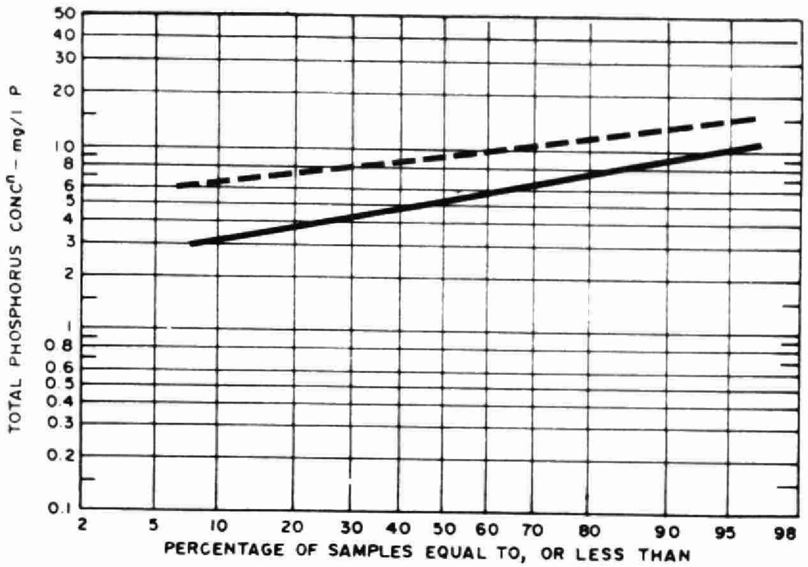


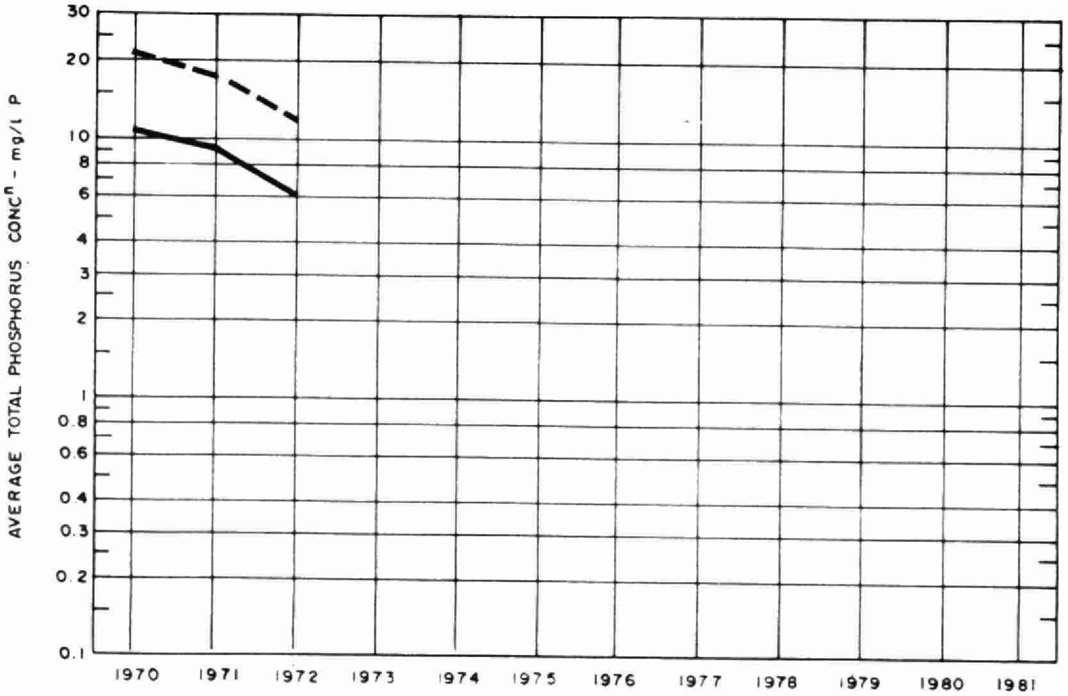
SUSPENDED SOLIDS





PHOSPHORUS

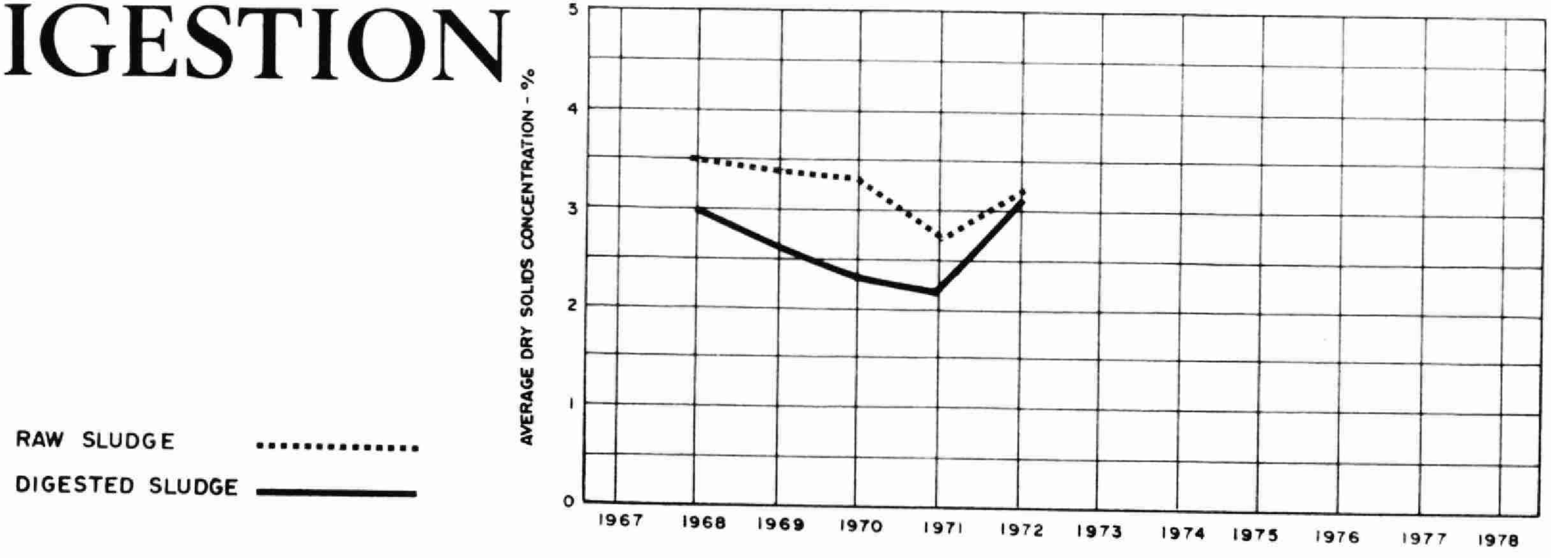


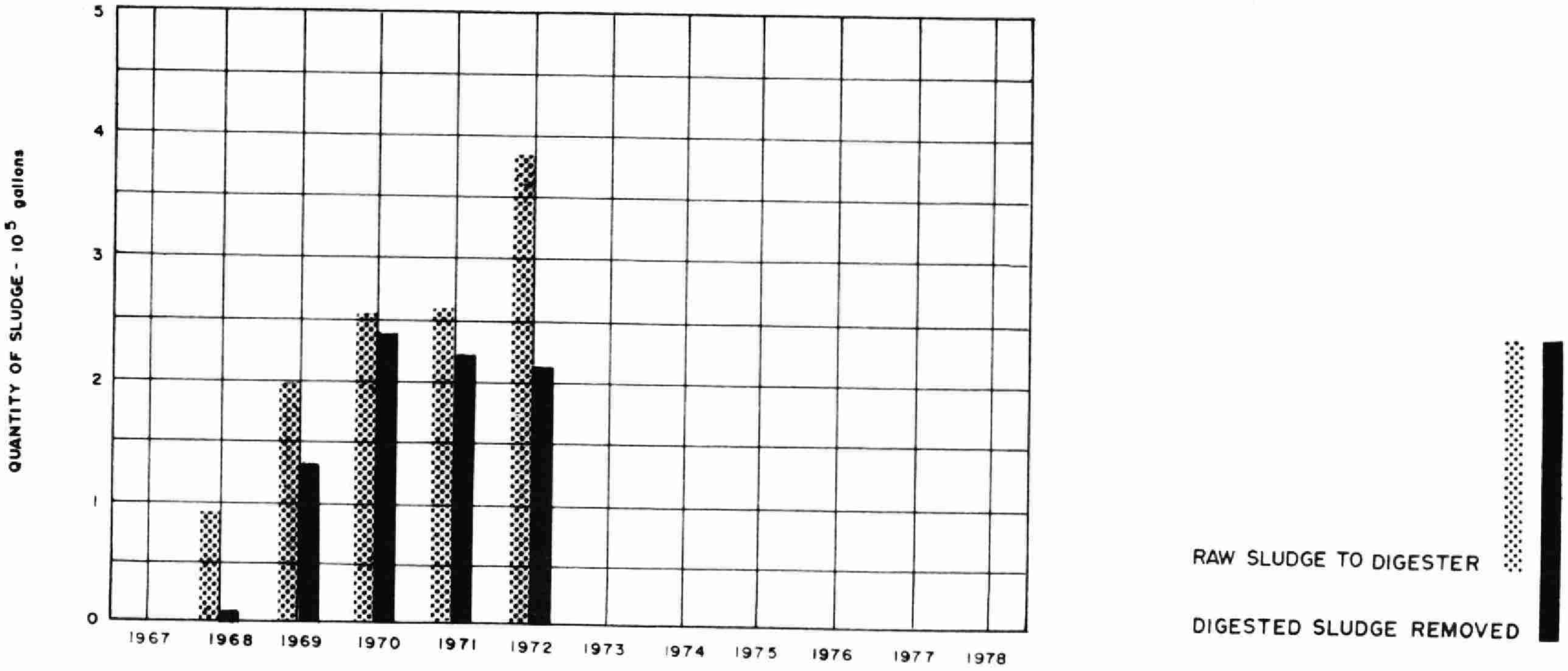


PLANT INFLUENT – – – – –

PLANT EFFLUENT ———

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
AVERAGE DRY SOLIDS CONCENTRATION - %
0
1
2
3
4
5
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978


QUANTITY OF SLUDGE - 10^5 gallons
0
1
2
3
4
5
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

TREATMENT DATA

	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT	
MONTH	QUANTITY REMOVED cubic feet	Cl_2 USED pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000 ft^3}{lb BOD}$	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^3 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	T. S. %	AMOUNT HAULED cubic yards
JAN	17	471	19.0	160	139	2300	.13	6	28	3.0	81	36	-	-	.7	212
FEB	12	465	22.0	100	135	2400	.07	20	26	3.4	72	-	-	-	1.5	-
MAR	23	301	7.4	400	805	3000	.36	2	40	3.3	68	36	2.2	67	1.9	212
APR	21	316	6.2	-	60	2400	-	-	32	3.9	73	6	-	-	1.7	37
MAY	24	301	7.2	70	85	2500	.08	10	39	3.8	65	16	2.4	-	1.0	93
JUNE	15	349	9.2	60	125	2300	.07	13	40	3.0	80	28	2.8	-	.6	167
JULY	16	285	-	95	168	2000	-	-	28	2.7	65	-	-	-	-	-
AUG	20	313	-	130	133	2200	-	-	26	3.1	70	19	3.5	-	.4	111
SEPT	19	400	-	130	140	3500	-	-	24	2.9	67	-	-	-	.6	-
OCT	23	356	-	110	252	2200	-	-	31	36	72	25	3.7	-	2.1	148
NOV	20	504	-	120	270	1700	-	-	32	2.5	77	9	4.5	-	.7	56
DEC	16	496	-	190	168	1300	-	-	30	2.7	80	34	2.5	63	1.6	204
TOTAL	226	4557	-	-	-	-	-	-	376	-	-	209	-	-	-	1240
AVG.	5.1 cu.ft/mil gal	379	10.4	142	206	2400	.14	10	31	3.2	73	17	3.1	65	1.2	103

LABORATORY LIBRARY
96936000119886

Date Due

DEC 2 8 1973			

LABORATORY LIBRARY
MINISTRY OF THE ENVIRONMENT